

CO15-004-e

Implanted functional electrical stimulation of the fibularis communis nerve: Impacts on gait quality and consequences on cerebral cortex activityF. Chantaine^{a,*}, F. Moissenet^a, C. Schreiber^a, G. Matgé^c, A. Thibaut^b, S. Laureys^c, P. Filippetti^a^a CNRFR, Rehazenter, laboratoire d'analyse du mouvement et de la posture, 1, rue André-Vésale, 2674 Luxembourg, Luxembourg^b Département de neurochirurgie, CHL Luxembourg, Luxembourg^c Université de Liège, Coma Science Group, Centre de recherches du Cyclotron

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E-mail address: frederic.chantaine@rehazenter.lu**Keywords:** Functional electrical stimulation; Spastic equinus; Stroke**Introduction.**— Spastic equinovarus is the main abnormality disturbing gait after stroke. It brings to a steppage gait, eases compensations and increases the risk of falls. Functional Electrical Stimulation (FES) of the fibularis communis nerve, by stimulating tibialis anterior, peroneus longus and brevis muscles, has been proposed as a solution to allow efficient and sufficient ankle dorsiflexion during swing phase. In this study, the implanted SEF impacts on gait quality and its consequences on cerebral cortex activity have been considered.**Methods.**— Twelve patients with equinovarus or spastic equinus have been introduced in this study and surgically implanted. Four patients were excluded (due to medical complications or inability to pursue the study) and the eight others were followed during at least six months. A physical examination and assessments of kinematics, dynamics, iconographic (MRI and nuclear imaging) and electrophysiologic were performed for each patient before and after implantation. This protocol was approved by the National Ethics Committee of Luxembourg. **Results.**— For each patient, the ankle kinematics during swing phase and the repositioning of the foot at initial contact were improved after implantation. The genu recurvatum of three patients was also corrected and, on the whole, the knee dynamics was improved for six patients. Both gait velocity (10-meter walk test) and endurance (6-minute walk test) increased with SEF. Finally, significant modifications were observed on the cerebral cortex activity after one year of stimulation.**Discussion and conclusion.**— The use of implanted SEF of the fibularis communis nerve leads to a clear improvement of gait quality, by making it more functional and near normal. Moreover, we show that a corrected ankle kinematics can bring to better proximal joint kinematics (reduction of genu recurvatum). Regarding the cerebral cortex activity, it tends to be normalized after one year of cyclical activation of the fibularis communis nerve. This study must be extended to more patients in order to define clear indication of this kind of SEF.<http://dx.doi.org/10.1016/j.rehab.2013.07.988>

CO15-005-e

Percutaneous hamstring lengthening with a Large-Gauge Needle a retrospective study. First results and technicA. Schnitzler^{*}, P. Denormandie, L. Mailhan, C. Jourdan, F. Genet
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E-mail address: alexis.schnitzler@rpc.aphp.fr**Keywords:** Surgery; Needle; Micro-invasive; Hamstring muscles; Posture**Introduction.**— After injury of the central nervous system or dementia loss of elasticity of the muscle hamstrings (IJ) is frequent. These deformations impact the quality of life of these patients.

We have developed a surgical procedure of percutaneous lengthening hamstrings with a Large-Gauge.

Method.— Retrospective study in 2012. Ten minutes after the local anesthesia the lengthening was started with a needle 16G (1.6 × 40 mm), without incision with a scalpel. The muscles were clinically targeted guided by anatomical landmarks and palpation. Tolerance, function and goniometric passive knee extension were assessed before the procedure, immediately after and 3 months after.**Results.**— There were 14 tenotomy, the average age was 77 years, four patients were treated both side. The knee flexion was 95° (±21°) before treatment, 47° (±22°) after treatment; the mean augmentation of the range of motion was 47° (±20°) ($p = 0.001$).**Discussion and conclusion.**— This new technique, simple, fast and minimally invasive, can reduce knee flexion and its functional consequences for patients severely disabled.<http://dx.doi.org/10.1016/j.rehab.2013.07.989>

CO15-006-e

Functional prognostic factors of non-functional upper limb surgery program in case of stroke or brain injuryB. Coulet^{*}, F. Coroian, Y. Van Ray, I. Laffont

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E-mail address: bertrand-coulet@wanadoo.fr**Keywords:** Upper limb; Non functional; Surgery**Objectives.**— A surgical program “non-functional” in the upper limb *cérébrolésé* (CNFMSC) is limited to objectives hygienic, aesthetic and facilitation “nursing”. In 40% of cases, we observe more gain with functional restoration of a rudimentary clip. The objective of this study is to determine the preoperative factors conditioning the functional benefit.**Materials and methods.**— Our retrospective study of 42 stroke patients, 35 vascular and seven post-traumatic average age 45.8 years and operated an average of 7.8 years. Their upper limb was initially non-functional with a score of Fugl-Meyer (FM) using distal 1,2/24 and classified according grip unimanuelle House 0 or I. Surgical programs were superimposable:

– Transfer of Superficial Flexors of the Fingers Deep, tenotomy elongation of Flexor of the Thumb;

– 27 extensor tenodesis wrist arthrodesis radius and 11 raccourcissantes wrist;

– eight neurotomies of the deep branch of the ulnar nerve for spasticity intrinsic identified preoperatively and seven tenotomies intrinsic for retraction.

Two groups were identified secondarily, 25 patients without improvement in grip and 17 having emerged rudimentary grip.

Results.— In case of functional gain, a vascular etiology was more common (14/17), time since injury 3.8 years shorter (against 4.5). Motor residual shoulder and elbow was present in all cases with a proximal average 22.4 FM/66 against 10/66 in the other. No significant intrinsic spasticity requiring ulnar neurotomy. A voluntary control of LFP present in 69% of cases.

In the functional group, after correction of the hand proximal FM increases reflecting a gain for the shoulder and elbow.

Discussion.— Program gives CNFMSC in the majority of cases fulfilling the objectives satisfaction aesthetic, hygienic and nursing. Our study shows that the appearance of a rudimentary grip pollicio-digital is possible if *cérébrolésions* of vascular origin carried out early with a proximal motor and kept without intrinsic spasticity. Achieving neurotomy ulnar compromises the function. Preoperative evaluation block engines is essential.<http://dx.doi.org/10.1016/j.rehab.2013.07.990>

CO15-007-e

Predominant factors of motor deficiencies in adult spastic paresis: Infant vs adult-acquired lesionsC. Van Reeth^{*}, C. Pauwels, N. Bayle, C.-M. Loche, J.-M. Gracies

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E-mail address: celine.vanreeth@ach.aphp.fr**Keywords:** Spastic paresis; Infant paresis; Motor limitations; Spasticité; Muscle length; Active range of motion